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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/539,089
Filing Date: December 14, 2005
Appellant(s): VEIKONHEIMO ET AL.

Scott W. Cummings
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 12/15/2009 appealing the Office action mailed 6/15/2009.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The amendment after final received 9/15/2009 was entered; however, the advisory action mailed on 9/23/2009 incorrectly indicated that the amendment after final was not entered. The amendment after final was indeed entered and applicant's request for reconsideration was considered as correctly noted on the advisory action.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

Listing of Evidence Relied Upon:

WO 0154971 A1	Varis	8-2001
GB 9792/NO 10907	Parsons*	5-1900/12-1900
CA 245576	Akimoff**	2-1924
Affidavit	Tomi Veikonheimo	1-2008

*GB 9792 is an English language equivalent of NO 10907 per applicant's IDS dated 6/19/2007; **Akimoff (CA 245576) is an English version of Akimoff (SE 61072).

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-10 and 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Varis (WO 0154971 A1), in view of Parsons (GB 9792/NO 10907; with these two references presenting the same disclosure, as indicated in the previous

office action), and further in view of Akimoff (CA 245576), disclosed by applicant. Varis discloses an arrangement in a counter rotating propulsion system (similar to the arrangement in Fig. 1 of applicant's disclosure that applicant indicates is "realized" with counter rotating propellers (CRP), see page 5 of applicant's specification), comprising an aft propeller installed on a thruster [4] rotatable about a vertical axis, and a forward propeller [3] installed on a shaft [2] or on a thruster, whereby the aft propeller and the forward propeller have opposite directions of rotation and the aft and forward propellers are arranged opposing each other, the cap on the forward propeller [3] having a length, each of the propellers having a hub with a cap, the hub and cap associated with the forward and aft propellers are arranged opposing each other. Varis does not disclose the at least two equally distributed flow plates arranged on the cap of the forward propeller radially projecting from the cap, and the flow plates on the whole length of the forward cap and link up to each other and extend beyond an aft facing end of the cap. Parsons discloses a propeller hub (boss) cap (cone) (Figs. 3-4) comprising a plurality of equally spaced flow plates (blades or vanes) [v] projecting from the cap in a radial direction with no inclination and without extending beyond the diameter of the cap for reducing cavitation effects and enhancing flow characteristics. Parsons does not disclose the flow plates on the whole (entire) length of the cap, but is considered to disclose the limitations of claims 2-6, 10, 13 and 14 based on Figs. 5-6. Regarding claims 7 and 8, Parsons discloses the flow plates attached to the hub cap but does disclose the method of attachment, whether integral (integrated) or fixed to the cap by welding or bolts; however, it would have been obvious to one of ordinary skill in the art

to make the flow plates integrated with the hub cap for ease of manufacture and assembly, and it would have also been obvious to one of ordinary skill in the art to affix the flow plates to the hub cap using any known means such as welding or bolts as a mere design choice depending on material selection and the structural characteristics desired for the attachment means. Parsons also indicates (see second to last paragraph of specification, lines 40-42) that one beneficial result of the plates (vanes or blades) about the hub cap (cone) is that water more easily closes in and presses (imparts pressure) on the cap (cone abaft the propeller boss), thus imparting additional forward thrust to the shaft; an extension of the vanes or blades beyond an aft facing end of the cap would enhance this beneficial result by allowing water to even more effectively close in and press on the cap to impart pressure and additional forward thrust to the shaft. Akimoff discloses flow plates [17] that link up to each other and extend beyond an aft facing end of a propeller hub cap [13] (see Figs. 3-6); the flow plates enhances flow of water about the propeller in order to improve propeller performance (see pages 1-3 describing advantages presented by the Akimoff cap or 'fairwater'). Akimoff also discloses flow plates extending substantially the whole length of the cap (see Fig. 5); the cap includes flange [14] which is indicated as a 'suitable fastening means' for the cap [13]; it would have been obvious to one of ordinary skill in the art to utilize a fastening means which would eliminate the flange, thereby providing the flow plates extending the whole length of the cap; the extension of the flow plates any length of the cap would have been considered obvious to one of ordinary skill in the art as a matter of design choice depending on the specific flow characteristics desired for the

flow plates. In view of the foregoing, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains to provide a propeller cap with flow plates for the forward propeller hub of Varis that would have the flow plates linking up to each other and extending beyond an aft facing end of the hub cap and extend the whole length of the cap, to create the invention as claimed by applicant. The rationale would have been to reduce or minimize cavitation effects and provide for streamlined flow of water past the hub cap. Making the flow plates of the forward propeller hub cap of such a combination link up to each other and extend beyond an aft facing end of the cap and extend the whole length of the cap would provide the expected result of enhanced water flow for the propeller arrangement depending on the specific flow characteristics desired. The extent to which the flow plates link up to each other, as well as the amount of extension of the flow plates along the cap or the exact dimensions of the plates, would have been considered obvious to one of ordinary skill in the art as a matter of engineering design choice depending on the specific flow characteristics desired for the propeller arrangement. Although the references alone or in combination do not explicitly disclose that the flow plates are constructed and arranged to eliminate cavitation in the separation zone or the space between the forward and aft propellers when the aft propeller is not co-axial with the forward propeller; the combination of references is considered to disclose all claimed structural features and limitations recited by the applicant and the structural features and limitations disclosed are considered capable of such function since the combination would eliminate (at least in part) cavitation effects

in the space between the forward and aft propeller when the forward and aft propellers are arranged as to not be exactly co-axial with each other. Regarding claims 15 and 16, Parsons in Fig. 6 discloses that the flow plates do not extend beyond the maximum outer diameter of the flow cap. The amount of extension of the flow plates beyond the maximum diameter of the cap would have been obvious to one of ordinary skill (similar to that described above for the extension of the flow plates along the length of the cap) as a matter of design choice depending on the specific flow characteristics desired for the propeller arrangement in such a combination. Similarly, the diameter, number, position and method of attaching the flow plates, would all be considered obvious to one of ordinary skill in the art to which the subject matter pertains as a matter of engineering design choice depending on the desired performance and strength characteristics.

(10) Response to Argument

Applicant argues the rejection of claims 1, 12, 5, 14 and 16, in this order.

Claim 5 depends from claim 1; claims 14 and 16 depend from claim 12.

For claim 1, applicant argues that Varis fails to disclose or teach a propeller hub with a cap and at least two equally distributed flow plates, Parsons fails to disclose flow plates that extend the entire length of the cap or beyond the aft end of the cap, Parsons is not applicable because the reference is directed to a single propeller arrangement that does not have the unique problems associated with counter rotating propeller (CRP) systems, the rejection improperly focuses on the differences between the claimed invention and the prior art and fails to consider the invention as a whole, the rejection fails to provide guidance with regard to the teachings of Parsons as to whether

one should modify the forward of aft propeller arrangement of a CRP system such as that described by Varis, the rejection fails to provide guidance on how to modify Varis to incorporate Parsons, and the rejection fails to adequately address secondary (declaration/affidavit) evidence.

In rebuttal, Varis is used to show a CRP system. Parsons is used to disclose a propeller hub cap with a plurality of equally spaced flow plates. Akimoff is used to show flow plates that extend the entire length or beyond the cap. The rejection combines known features to achieve expected results. The secondary evidence provided by applicant's declaration/affidavit does not overcome the rejection and does not provide a convincing argument that it would not have been obvious to extend the flow plates of Parsons beyond the aft facing end of the hub cap due to an increase in surface area and friction that would negatively affect flow efficiency, because Akimoff's teaches enhanced water flow and propeller performance and the empirical evidence presented in support of applicant's declaration/affidavit does not demonstrate that any unexpected results were achieved.

Varis discloses a CRP system similar to applicant's invention. Varis does not disclose the at least two equally distributed flow plates arranged on the cap of the forward propeller radially projecting from the cap, with the flow plates on the whole length of the forward cap linking up to each other and extending beyond an aft facing end of the cap. Parsons discloses a cap (cone) comprising a plurality of equally spaced flow plates (blades or vanes) [v] projecting from the cap in a radial direction that do not extend beyond the diameter of the cap. Parsons teaches that the flow plates will reduce

cavitation (see pgs 1-4 describing objects of invention; particularly, pg. 4, lines 34-42). Parsons also indicates (see second to last paragraph of specification, lines 40-42) that one beneficial result of the plates (vanes or blades) about the hub cap (cone) is that water more easily closes in and presses (imparts pressure) on the cap (cone abaft the propeller boss), thus imparting additional forward thrust to the shaft. Parsons does not disclose the flow plates on the whole (entire) length of the cap. Akimoff discloses flow plates [17] that link up to each other and extend beyond an aft facing end of a propeller cap [13] (see Figs. 3-6); the flow plates enhance flow of water (circulation) and improve propeller performance by decreasing cavitation and increasing thrust (see pgs. 1-3 describing advantages presented by the Akimoff cap or 'fairwater'; particularly pg.2, line 23 through pg. 3, line 12). Akimoff also discloses flow plates extending substantially the whole length of the cap (see Fig. 5); the cap includes flange [14] which is indicated as a 'suitable fastening means' for the cap [13]. In view of the foregoing, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains to provide a propeller cap with flow plates for the forward propeller hub of Varis that would have the flow plates linking up to each other and extending beyond an aft facing end of the hub cap and extend the whole length of the cap, to create the invention as claimed by applicant. The rationale would have been to reduce or minimize cavitation effects and provide for streamlined flow of water past the propeller cap. Making the flow plates of the forward propeller hub cap of such a combination link up to each other and extend beyond an aft facing end of the cap and extend the whole length of the cap would provide the expected result of enhanced water

flow for the propeller arrangement. The extent to which the flow plates link up to each other, as well as the amount of extension of the flow plates along the cap or the exact dimensions of the plates, would have been considered obvious to one of ordinary skill in the art as a matter of engineering design choice depending on the specific flow characteristics desired for the propeller arrangement. Although the references alone or in combination do not explicitly disclose that the flow plates are constructed and arranged to eliminate cavitation in the separation zone or the space between the forward and aft propellers when the aft propeller is not co-axial with the forward propeller; the combination of references disclose all claimed structural features and such a combination would have the expected result of reducing cavitation in this zone.

For claim 12, applicant argues similarly to claim 1, with the additional argument that the combination of Varis, Parsons and Akimoff fails disclose that the flow plates are constructed and arranged to eliminate cavitation in a separation zone defined between opposing first and second caps of a CRP arrangement and fails to disclose that the flow plates do not extend beyond the diameter of the cap (applicant alleges that Akimoff teaches that the flow plates 'exceed the outer diameter of the cap'.

In rebuttal, the claim limitation reciting "wherein the flow plates are constructed and arranged to eliminate cavitation in the separation zone" is functional language and does not present distinguishing structural features defining over the prior art and the combination of Varis, Parsons and Akimoff would be considered capable of performing this function, and Parsons discloses flow plates [v] which do not extend beyond the maximum outer diameter of cap [x], and Akimoff presents several embodiments in Figs.

3 and 4 showing flow plates [17] extending beyond the diameter of cap [13] and Figs. 5 and 6 showing flow plates [10] not extending beyond the diameter of the hub cap (round bulb adjacent flange [14]) demonstrating that the amount of extension of the flow plates beyond the hub cap can vary depending on design choice; Akimoff does not specifically indicate in the specification that the flow plates 'exceed the outer diameter of the cap'.

For claim 5, applicant argues that the combination of Varis, Parsons and Akimoff fails disclose that the number of flow plates is independent of the number of blades of the forward propeller, and that the position of the flow plates is independent of the position of the blades.

In rebuttal, the recited claim limitation "wherein the number of flow plates is independent of the number of the blades of the forward propeller and the position of the flow plates is independent of the position of the blades of the forward propeller" is considered met by such a combination since applicant has not defined "independent" and has not recited any specific number or position for the flow plates or propeller blades. Akimoff shows various numbers and positions of flow plates in Figs. 3-12, and Fig. 1 applies to a screw propeller of any design (see pg. 3, lines 24-25).

For claim 16, applicant argues that the combination of Varis, Parsons and Akimoff fails disclose that the second cap has a maximum outer diameter, and that the flow plates do not extend beyond the maximum outer diameter.

In rebuttal, Parsons discloses flow plates [v] which do not extend beyond the maximum outer diameter of cap [x]. Akimoff presents several embodiments with Figs. 3 and 4 showing flow plates [17] extending beyond the diameter of cap [13] and Figs. 5

and 6 showing flow plates [10] not extending beyond the diameter of the hub cap (round bulb adjacent to flange [14]) demonstrating that the amount of extension of the flow plates with respect to the cap can vary with respect to the diameter of the cap. The amount of extension of the flow plates with respect to the diameter of the cap would have been obvious to one of ordinary skill in the art as a matter of engineering design choice depending on the specific flow characteristics desired for the propeller arrangement.

The KSR decision renders applicants arguments with respect to motivation to combine moot. No longer is TSM the only rationale rendering claims unpatentable. Rationale for arriving at a conclusion of obviousness suggested by the Supreme Court in KSR include combining prior art elements according to known methods to yield predictable results, simple substitution of one known element for another to obtain predictable results, use of known technique to improve similar devices in the same way, applying a known technique to a known device ready for improvement to yield predictable results, and obvious to try by choosing from a finite number of identified, predictable solutions, with a reasonable expectation of results. The above rejection combines known features in a predictable fashion to achieve expected results. The known features are the CRP system and flow plate configurations, and the expected results are the reduction of cavitation and improved water flow from the propeller.

For the foregoing reasons, it is believed that the rejections should be sustained.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

(12) Evidence Appendix

The affidavit received with applicant's 1/5/2009 response is relied upon by the appellant in the appeal as identified by the examiner in the Evidence Relied Upon section of this examiner's answer.

Applicant did not indicate where the affidavit/declaration was considered during prosecution of the application; however, the affidavit/declaration was considered by the examiner in the non-final office action mailed on 1/29/2009 (see page 5, paragraph 6), in the final office action mailed on 5/15/2009 (see page 6, paragraph 9), and in the advisory action mailed on 9/23/2009 (see attached continuation sheet).

An appeal conference was held on January 6, 2010 with Primary Examiner Lars Olson, Supervisory Patent Examiner S. Joseph Morano and Appeal Practice Specialist Heather Shackelford.

Respectfully submitted,

/Daniel V Venne/

Examiner, Art Unit 3617

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